10/10 Algebra I - Downing

Warm-up Determine if the relation is a linear function

Ex)

x	y
2	1
5	5
11	13
20	25

+3, +6, +9; +4, +8, +12

$\frac{4}{3}$

$\frac{8}{6} = \frac{4}{3}$

$\frac{12}{9} = \frac{4}{3}$

All ratios are the same. Makes it Linear

Ex)

x	y
2	3
4	6
6	12
8	24

Finding slope with 2 points

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$$

slope formula: Given two points $(x_1, y_1)(x_2, y_2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Ex) $(-10, 10)$ $(-5, 4)$
x_1, y_1 x_2, y_2

$$m = \frac{4-10}{-5-(-10)} = \frac{-6}{5}$$

Stack Method

Ex) $(-10, 10)$ / $(-5, 4)$: +5, -6 or $(-5, 4)$ / $(-10, 10)$: -5, $+6$

$m = \frac{-6}{5}$ $m = \frac{6}{-5}$

Ex) $f(8) = 2$ $f(11) = 1$
$(8, 2)$ $(11, 1)$
$(8, 2)$ / $(11, 1)$: +3, -1

$m = -\frac{1}{3}$

Ex) $(-2, 7)(-1, 4)$

$(-2, 7)$ / $(-1, 4)$: +1, -3

$m = \frac{-3}{1}$

Ex) $f(1) = -2$ $f(2) = -5$
$(1, -2)$ $(2, -5)$
$1, -2$ / $2, -5$: +1, -3

$m = \frac{-3}{1}$

Ex) $f(-2) = 6$ $f(-1) = 3$
$(-2, 6)$ $(-1, 3)$
$-2, 6$ / $-1, 3$: +1, -3

$m = \frac{-3}{1}$

Writing a linear equation with 2 points

$y = \boxed{m}x + \boxed{b}$

m: slope; b: y-intercept

Steps	Example
1. Find slope using slope formula or stack method.	(2, -3) and (4, 1) +2 ⟨2, -3 / 4, 1⟩ +4 $m = \frac{4}{2} = \boxed{\frac{2}{1}} = 2$
2. Choose a point (x, y)	(4, 1) $m = 2$
3. Using $y = mx + b$ replace m, x, and y	$y = mx + b$ $1 = 2(4) + b$
4. Solve for b	$1 = 8 + b$ $-8 \quad -8$ $-7 = b$
5. Using $y = mx + b$, replace m + b	$y = 2x - 7$

Ex) (12, -3) (14, -4)

+2 ⟨(12, -3) / (14, -4)⟩ -1 $m = -\frac{1}{2}$

(12, -3)
x y

$-3 = -\frac{1}{2}(12) + b$
$-3 = -6 + b$
$+6 \quad +6$
$3 = b$

$y = -\frac{1}{2}x + 3$

HW
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#11-14 ALL
#16-28 Even

Ex) f(1) = -2 f(3) = 10
(1, -2) (3, 10)

+2 ⟨(1, -2) / (3, 10)⟩ +12 $m = \frac{12}{2} = 6$

(3, 10)
x y
$10 = 6(3) + b$
$10 = 18 + b$
$-18 \quad -18$
$-8 = b$

$y = 6x - 8$